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28. (Amended) An apparatus, comprising:  
means for storing a portion of sound data in a memory buffer of a computer;  
means for analyzing the portion of sound data using heuristics to identify at least one  
sound feature from the portion of sound data; and  
means for executing at least one haptic effect based on the at least one sound feature, the  
haptic effect being associated with the portion of sound data.

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### REMARKS

Applicant respectfully requests entry of the foregoing amendments, and reconsideration of the application in light of the amendments above and the remarks that follow. The foregoing Amendments to the Claims have been made for purposes of clarity and readability, and not for reasons related to patentability. Claims 1-28 remain pending in the Application.

Applicant gratefully acknowledges the courtesies extended to his representative by an Examiner in an interview on January 29, 2003. During the interview, the recited claim term "analyzing" was discussed in view of the references of record. Applicant's representative noted that the recited claim term "heuristics" is absent from the cited references of record.

### Allowable Subject Matter

Applicant gratefully acknowledges the Examiner's indication, on page 5 of the Office Action, that Claims 2-9, 12-18, and 22-26 are allowable. Although all of these claims have been amended for purposes of clarity and readability, Applicant respectfully submits that they are allowable for at least the same reasons as the originally presented claims.

### The Claims are Patentable over Chang

Claims 1, 10, 11, 19-21, 27, and 28 stand rejected under 35 U.S.C. § 102(a) as being anticipated by U.S. Patent No. 6,285,351 to Chang (hereinafter "*Chang*"). Applicant respectfully traverses this rejection for the reasons set forth below.

As recited by independent claim 1, a portion of sound data is stored in a memory buffer of a computer. The portion of sound data is analyzed using heuristics to identify at least one

sound feature from the portion of sound data. At least one haptic effect is executed based on the at least one sound feature, and is associated with the portion of sound data.

In contrast, *Chang* does not disclose analyzing a portion of sound data using heuristics. In fact, Chang is entirely silent regarding heuristics.

Accordingly, for at least this reason, Applicant respectfully requests the withdrawal of the rejection of independent claim 1 over *Chang*. Additionally, Applicant respectfully requests the withdrawal of the rejection of claim 10, which depends from claim 1, and is patentable for at least the same reason.

For at least the same reason discussed above, Applicant respectfully submits that independent claims 11, 21, and 28 are patentable over *Chang*, and respectfully requests the withdrawal of the rejection of these claims for at least this reason. Additionally, Applicant respectfully requests the withdrawal of the rejection of dependent claims 19, 20, and 27, which depend from the claims 11 and 21, and are patentable for at least the same reason.

### Conclusion

Applicant respectfully submits that a Notice of Allowance is in order, and earnestly solicits such. Should the Examiner have any questions regarding this communication, or the application in general, he is invited to telephone the undersigned at 703-456-8108.

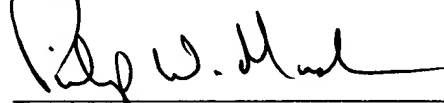
The Commissioner is hereby authorized to charge any appropriate fees under 37 C.F.R. §§1.16, 1.17, and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 50-1283.

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Enclosure: Appendix indicating Amendments



## APPENDIX

### Marked-Up Amendments to the Claims

1. (Amended) A method [for triggering haptic sensations from sound features detected in sound output from a computer said haptic sensations able to be delivered to a user of a haptic feedback device in communication with said computer, the method], comprising:

storing a portion of sound data [that is output to a user as audio from an application program running on said computer, wherein said portion of sound data is stored] in a memory buffer of [said] a computer;

analyzing [said] the portion of sound data using [intelligent] heuristics to [extract] identify at least one sound feature from [said] the portion of sound data; and

[triggering the execution of] executing at least one haptic effect based on [said] the at least one [extracted] sound feature, [wherein said at least one] the haptic effect [is commanded to said haptic feedback device approximately correlated to said output of said] being associated with the portion of sound data [to said user as audio, said haptic effect causing a haptic sensation to be output to said user].

2. (Amended) [A] The method [as recited in] of claim 1 [wherein said], the analyzing [said portion of said sound data includes processing said sound data into a plurality of different frequency ranges and] including:

[extracting said] identifying at least one frequency component of a sound feature, the at least one frequency component being from [each of said] a first frequency range [ranges].

3. (Amended) [A] The method [as recited in] of claim 2, wherein [a] at least one haptic effect executed is associated with [each of said] the at least one frequency component [ranges if said sound feature is present in said frequency range].

4. (Amended) [A] The method [as recited in] of claim [2 wherein said processing said] 1, the analyzing including:

separating the portion of sound data into a plurality of [different] frequency components associated with a plurality of frequency ranges [includes] by applying a plurality of filters to [said] the portion of sound data; and

identifying a sound feature associated with at least one frequency component from the plurality of frequency components.

5. (Amended) [A] The method [as recited in] of claim 4 [wherein], the plurality of filters having at least: [one]

a low-pass filter[, at least one]; and

a high-pass filter[, and at least one bandpass filter is applied to said portion of sound data to provide at least three frequency ranges].

6. (Amended) [A] The method [as recited in] of claim [2 wherein said processing said] 1, the analyzing including:

separating the portion of sound data into a plurality of [different] frequency components associated with a plurality of frequency ranges [includes] using a fast Fourier transform (FFT); and

identifying a sound feature associated with at least one frequency component from the plurality of frequency components.

7. (Amended) [A] The method [as recited in] of claim 6, wherein a number of outputs from [said] the fast Fourier transform are grouped to provide [each of said] sound features associated with each frequency range of the plurality of frequency ranges.

8. (Amended) [A] The method [as recited in] of claim 4, wherein [each of said] the at least one frequency component [frequency ranges] is each associated with a [different] haptic [sensation] effect related to the frequency range associated with the at least one frequency component.

9. (Amended) [A] The method [as recited in] of claim [8] 4, wherein [each of said] the at least one frequency component [frequency ranges] is each uniquely associated with a periodic haptic [sensation] effect having a [different] frequency corresponding to the plurality of frequency ranges associated with the at least one frequency component.

10. (Amended) [A] The method [as recited in] of claim 1, wherein [said] the at least one haptic effect [triggered by said at least one sound feature] was previously mapped to [said] the at least one sound feature.

11. (Amended) A method, [for providing haptic effects based on sound data played by a computer, said haptic effects able to be output as haptic sensations to a user of a haptic feedback device in communication with said computer, the method] comprising:

storing a portion of [said] sound data [that is output from an application program running on said computer, wherein said portion of sound data is stored] in a memory buffer of [said] a computer;

analyzing [said] the portion of sound data using [intelligent] heuristics to [extract] identify at least one high-level sound feature from said portion of sound data, [wherein said] the at least one high-level sound feature [in said portion of sound data has been] being associated with at least one high-level haptic effect; and

[commanding said associated] executing the at least one high-level haptic effect [to be output] approximately [when said] with an output of the associated high-level sound feature [is played by said application program].

12. (Amended) [A] The method [as recited in] of claim 11, the analyzing including: [wherein said analyzing said portion of said sound data includes processing said sound data into a plurality of different frequency ranges and]

[extracting said] identifying at least one frequency component of a sound feature from [each of said] a first frequency range [ranges].

13. (Amended) [A] The method [as recited in] of claim 12, wherein [a] the at least one high-level haptic effect is associated with [each of said] the at least one frequency component [ranges having said sound feature].

14. (Amended) [A] The method [as recited in] of claim [12 wherein said processing said] 11, the analyzing including:

separating the portion of sound data into a plurality of [different] frequency components associated with a plurality of frequency ranges [includes] by applying a plurality of filters to [said] the portion of sound data; and

identifying a sound feature associated with at least one frequency component from the plurality of frequency components.

15. (Amended) [A] The method [as recited in] of claim [12] wherein said processing said] 11, the analyzing including:

separating the portion of sound data into a plurality of [different] frequency components associated with a plurality of frequency ranges [includes] using a fast Fourier transform (FFT); and

identifying a sound feature associated with at least one frequency component from the plurality of frequency components.

16. (Amended) [A] The method [as recited in] of claim 15, wherein a number of outputs from [said] the fast Fourier transform are grouped to provide [each of said] sound features associated each frequency range from the plurality of frequency ranges.

17. (Amended) [A] The method [as recited in] of claim [13] 14, wherein [each of said] the at least one frequency component [frequency ranges] is each associated with a [different] haptic effect related to the frequency range associated with the plurality of frequency components.

18. (Amended) [A] The method [as recited in] of claim [17] 14, wherein [each of said] the at least one frequency component [frequency ranges] is each uniquely associated with a periodic haptic effect having a [different] frequency corresponding to the plurality of frequency ranges associated with the at least one frequency component.

19. (Amended) [A] The method [as recited in] of claim 11, wherein [said commanded] the least one high-level haptic effect is [output] executed as a haptic sensation output [to said user] by [said] a haptic feedback device.

20. (Amended) [A] The method [as recited in] of claim 11, wherein [said commanded] the at least one high-level haptic effect [is not output to said user but] is stored in memory of [said] the computer as a created haptic effect.

21. (Amended) A computer readable medium [including program instructions for providing haptic sensations correlated with sound output from a computer to a user of a haptic feedback device in communication with said computer, the program instructions performing steps] having code stored thereon, the code comprising:

code to store [storing] a portion of sound data [that is to be output to a user as audio from an application program running on said computer, wherein said sound data is stored] in a memory buffer of [said] a computer;

code to analyze [analyzing said] the portion of sound data using heuristics to identify [extract] at least one sound feature from [said] the portion of sound data; and

code to execute [assigning] at least one haptic effect [to said] based on the at least one sound feature, [wherein said at least one] the at least one haptic effect [is commanded to said haptic feedback device approximately during said output of said] being associated with the portion of [said] sound data [to said user as audio, said haptic effect causing a haptic sensation to be output to said user].

22. (Amended) [A] The computer readable medium [as recited in] of claim 21, the code to analyze [wherein said analyzing said portion of said sound data includes processing said sound data into a plurality of different frequency ranges and] including:

code to identify [extracting said] at least one frequency component of a sound feature, the at least one frequency component being from [each of said] a first frequency range [ranges].

23. (Amended) [A] The computer readable medium [as recited in] of claim 22, wherein [a] at least one haptic effect is associated with [each of said] the at least one frequency component [ranges if said sound feature is present in said frequency range].

24. (Amended) [A] The computer readable medium [as recited in] of claim [22 wherein said processing said] 21, the code to analyze including:

code to separate the portion of sound data into a plurality of [different] frequency components associated with a plurality of frequency ranges [includes] by applying a plurality of filters to [said] the portion of sound data; and

code to identify a sound feature associated with at least one frequency component from the plurality of frequency components.

25. (Amended) [A] The computer medium readable [medium as recited in] of claim [22 wherein said processing said] 21, the code to analyze including:

code to separate the portion of sound data into a plurality of [different] frequency components associated with a plurality of frequency ranges [includes] using a fast Fourier transform (FFT); and

code to identify a sound feature associated with at least one frequency component from the plurality of frequency components.

26. (Amended) [A] The computer readable medium [as recited in] of claim 24, wherein the code to analyze is operative to [each of said] associate each frequency component from the plurality of frequency components [frequency ranges is associated] with a [different] haptic [sensation] effect.

27. (Amended) [A] The computer readable medium [as recited in] of claim 21, wherein [said] the at least one haptic effect [commanded to said haptic feedback device] was previously mapped to [said] the at least one sound feature.

28. (Amended) An apparatus, [for triggering haptic sensations from sound features detected in sound output from a computer, said haptic sensations able to be delivered to a user of a haptic feedback device in communication with said computer, the apparatus] comprising:

means for storing a portion of sound data [that is output to a user as audio from an application program running on said computer, wherein said portion of sound data is stored] in a memory buffer of [said] a computer;



means for analyzing [said] the portion of sound data using [intelligent] heuristics to [extract] identify at least one sound feature from [said] the portion of sound data; and

means for [triggering the execution of] executing at least one haptic effect based on [said] the at least one sound feature, [wherein said at least one] the haptic effect being [is commanded to said haptic feedback device approximately correlated to said output of said] associated with the portion of sound data [to said user as audio, said haptic effect causing a haptic sensation to be output to said user].